In-Station Training

TM 23-10 Residential Fire-Exterior to the Attic

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Purpose

While most residential fires start on the interior, fires starting outside and extending into the building can provide unique challenges. Firefighters and officers need to understand the impact of building design and construction on fire spread and the impact of tactical operations.

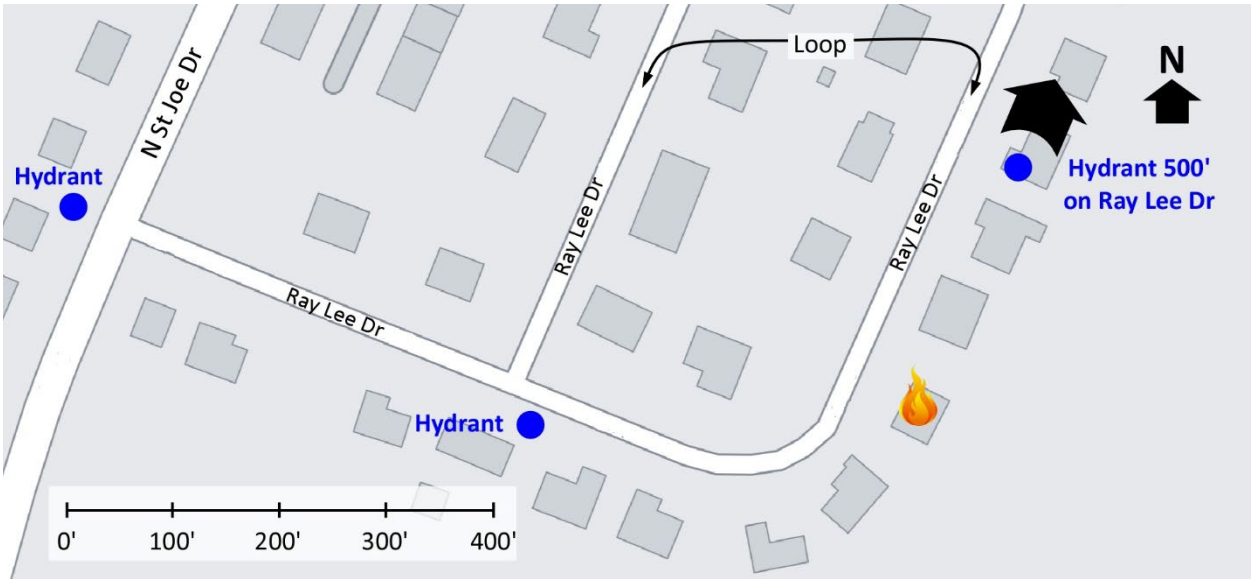
Learning Outcomes

Firefighters and officers perform an effective size-up; select an appropriate strategy, and implement tactics based on the strategic decision-making model.

Conducting the Drill

This incident involved a residential fire at 115 Ray Lee Drive in Park Hills, Missouri on January 10, 2023 at 15:30 (Daily Journal Missouri, 2023 & Radford, 2023). Review the map and photos (Figures 1-7) to gain an understanding of area and building involved.

Figure 1. Map of the Incident Area



Note: Adapted from Google. (2023a). [map 115 Ray Lee Drive, Park Hills, MO]. http://bit.ly/3RUiCRt.

The closest hydrant is located on Ray Lee Drive in the direction of travel from North Saint Joe Drive. Additional hydrants are located on North Saint Joe Drive and Ray Lee Drive as illustrated in Figure 1.

Figure 2. Aerial View

Note: Adapted from Google. (2023b). [aerial view 115 Ray Lee Drive, Park Hills, MO]. http://bit.ly/3Ij5lis.

Figure 3. Alpha/Delta Corner

Note: Adapted from Google. (2013a). [street view 115 Ray Lee Drive, Park Hills, MO]. http://bit.ly/40QaTYP.

Figure 4. Side Alpha

Note: Adapted from Google. (2013b). [street view 115 Ray Lee Drive, Park Hills, MO]. http://bit.ly/3xdGCFU.

Figure 5. Alpha/Bravo Corner

Note: Adapted from Google. (2013c). [street view 115 Ray Lee Drive, Park Hills, MO]. http://bit.ly/3YFFtmJ

Figure 6. Side Charlie

Note: Adapted from Realtor.com. (2023a). 115 Ray Lee Dr, Park Hills, MO 63601. https://bit.ly/3XqO3ny.

Figure 7. Basement

Note: Adapted from Realtor.com. (2023b). 115 Ray Lee Dr, Park Hills, MO 63601. https://bit.ly/40Rgv5e.

You have been dispatched to 115 Ray Lee Dr for a residential fire. You are the company officer or AIC of the first arriving engine and have your company's typical staffing. Temperature is 56° F with no appreciable wind from the north (Weather Underground, 2023).

1. What critical factors would you consider when dispatched and during response and what conversations would you have with your crew while responding?

While responding you hear a command officer, engine and advanced life support ambulance with typical staffing for your agency go enroute. The second engine will arrive approximately six minutes after you, followed by the command officer. The ALS ambulance will arrive approximately eight minutes after you arrive. All other units dispatched on the first alarm will arrive after the command officer. You are arriving from the northwest on Ray Lee Drive. Examine Figure 8 illustrating conditions on arrival.

Figure 8. Conditions on Arrival

Note: Adapted from Daily Journal Missouri (2023). *Tuesday fire destroys a Park Hills home* [video]. https://bit.ly/3K1Dm7V.

2. State your initial radio report (IRR) exactly as you would transmit it to dispatch.

3. What specific actions would you take (as the company officer) immediately upon arrival and exiting the apparatus and what task orders you would give your crew?

There is a fire involving the first-floor deck on Side Charlie with extension to the attic and first floor. There are no indications of fire in the walk out basement. Conditions on Side Delta are consistent with those on Side Alpha.

4. Would you change the action you are taking or modify the assignments given to your crew? If so, what task orders would you provide?

5. State your update report exactly as you would transmit it to dispatch.

6. State the tactical assignment you would give the next arriving engine exactly as you would transmit it.

7. State your conditions, actions, and needs (CAN) report that you would provide to the first arriving command officer as part of command transfer to IC #2?

Watch the first 01:00 of the incident video and examine Figure 9.

Figure 9. Attack Line Deployment

Note: Adapted from Daily Journal Missouri (2023). *Tuesday fire destroys a Park Hills hom*e [video]. https://bit.ly/3K1Dm7V.

As illustrated in Figure 9, the first attack line was stretched on[1] Side Charlie and the second line was stretched through Aide Alpha

8. Was the placement of the initial attack line on Side Charlie consistent with your initial line placement? What factors influenced placement of your initial attack line?

9. It appears that the companies operating at this incident initially operated in an offensive strategy and then shifted to defense, placing a pre-piped master stream on the first arriving engine into operation for fire control. What factors may have influenced initially remaining offensive and operating through Side Alpha and then shifting to defense? Was this consistent with the way in which you approached this incident (or would you anticipate IC #2 would have done so)? Why or why not?

10. What building construction factors may have had a significant influence on fire development and the impact of tactical operations? Consider how the fire may have extended from the area of the deck into the attic and how the ventilation profile changed during fire development.

Additional Learning: Many modern construction methods are extremely efficient from an engineering and energy conservation perspective, but present significant challenges under fire conditions. These include engineered floor joists, vinyl siding and soffits, and rigid foam sheathing. The house involved in this incident had engineered floor joists (see Figure 7), but these were not a factor as there was no fire in the basement. However, the fire likely extended through melted vinyl soffits and melting soffits, rigid foam insulation and vinyl siding increased ventilation to the fire in the attic with resulting increase in heat release rate (HRR) and rapid burn through of roof decking and trusses or truss failure.

Have a look at *Soffit installation - Vinyl Siding Guide* (VSI, 2023) to learn how vinyl soffits are constructed and consider how this may influence extension of an exterior fire or overlapping fire from a window or

[1] Use of the word “on” indicates that the line is operating on the exterior. The words “to” and “through” sound similar, so a tactical order to stretch a line “to” Side Charlie may be misunderstood as “through” Side Charlie. Using the word “on” makes the IC’s intent to have the line operate on the exterior clear without requiring further explanation (as long as all companies operating at the incident understand this convention).

door into the attic or trussloft. Figure 10 illustrates fire extension on the exterior with penetration through a melted vinyl soffit.

Figure 10. Vinyl Siding and Soffits

Note: Adapted from Hubbard, K. (2023). Outdoor Wake Forest fire spreads, damages home, officials say. http://bit.ly/3Iz2ulz.

Rigid foam sheathing has excellent insulating qualities and if installed correctly has sufficient structural strength to meet building code requirements. Some of these sheathing materials do not burn readily, but (a big but) will melt when exposed to fire conditions, increasing ventilation to the interior of the building (living spaces, attic, or trussloft). Increasing ventilation to a ventilation limited fire will increase the heat release rate (HRR). Fire exposure from the exterior can also melt siding and rigid foam sheathing, providing a opening for fire extension.

Watch *Tactical Consideration: Get Water in the Eaves for Attic Fires* (UL FSRI, 2022). Discuss the factors that may have influenced the effectiveness of this type of tactic if confronted with conditions encountered in this incident (and how they may have been overcome). Also discuss the capabilities and limitations of this tactic with other types of eave design (e.g., bird blocking). Then get out and stretch some hose, practice hose handling and attack line movement for an eave attack.

References

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